

# Study on Accident Severity Index, Time of Accident and Vehicle involved in Accident in Hisar City

Gourav Grewal<sup>1</sup>, Rahul Bansal<sup>2</sup>, V. K. Ahuja<sup>3</sup>

<sup>1</sup> Research scholar, Department of Civil Engineering, SBMNSE Rohtak (Haryana)

<sup>2</sup> Research scholar, Department of Civil Engineering, JCDCOE, Sirsa (Haryana)

<sup>3</sup> Head of Department in Civil Engineering, SBMNSE Rohtak (Haryana)

---

**ABSTRACT:** In spite of significant advances in highways safety, a lot of crashes in high severities still occur in highways. Investigation of influential factors on crashes enables engineers to carry out calculations in order to reduce crash severity. Therefore this paper deals with the Accident Severity Index, Time of accidents and the vehicles involved in accidents. The aim of this paper is to develop models by analyzing the road accident data at Hisar city. The data for the 3 year period from 2012 to 2014 were analyzed to build models to understand the nature and extent of the causes of accidents. It was found that total 255 accidents occurred during this period. Almost 40% victims were between ages 20 to 32 years. Bus and Truck accident comprise 12.99% city road accidents. The analysis result also shows the nature of contributory factors and hourly distribution of accident occurred most frequently.

**Keywords:** Severity, Time distribution, vehicle involved, Highway.

---

## 1. INTRODUCTION

The World Health Organization estimated that 1.17 million deaths occur each year worldwide due to road traffic accidents. However, that about 70 percent of the deaths occurs in developing countries. The increased rate of fatal road traffic accident worldwide has been attributed to population explosion and increased motorization. According to a report Published by W.H.O more than 3000 people are injured or disable every day. Road accidents appear to occur regularly at some flash points such as where there are sharp bends, potholes and at bad sections of the highways. At such points over speeding drivers usually find it difficult to control their vehicles, which then result to fatal traffic accidents, especially at night. Various categories of vehicular traffic are also involved in these fatal road traffic in the state. Research in this area have focused on cases of road traffic accidents, collation of road traffic accident statistics and impact assessment of road safety campaign. The Hisar City area is situated on the land of the state Haryana and it is in the northern part of India with a very high population density.

The most central part of this city area is under the administration of the Hisar Police, the land size of this part is 404308 hectares. As the economy of this area is totally depending on industrial and service sector and it is well known that this type of economy largely depend on quicker transport the vehicle pressure on the road is huge and consequently the occurrence of accident is generally very frequent. There are a number of the entry point (like NH 10, NH 65, OP Jindal Marg, etc.) can be identified easily through which a large number of flow come in and go out every day. In last year nearly 79 accidents occurred in this area and the number of vehicle and accident is increasing and decreasing simultaneously day to day. The traffic accident situation in Hisar Police station boundary as well as India is really alarming and the loss of lives and property damages are expected to continue if proper corrective measure are not taken accordingly by applying proper engineering measure through extensive research and investigations. Therefore, it is important that accident studies should be carried out for this area on a priority basis. The major objectives of this study are to provide information on the characteristics of accident, the location of most hazardous intersections and mid-block and provide recommendation to improve traffic safety in Hisar Police station boundary.

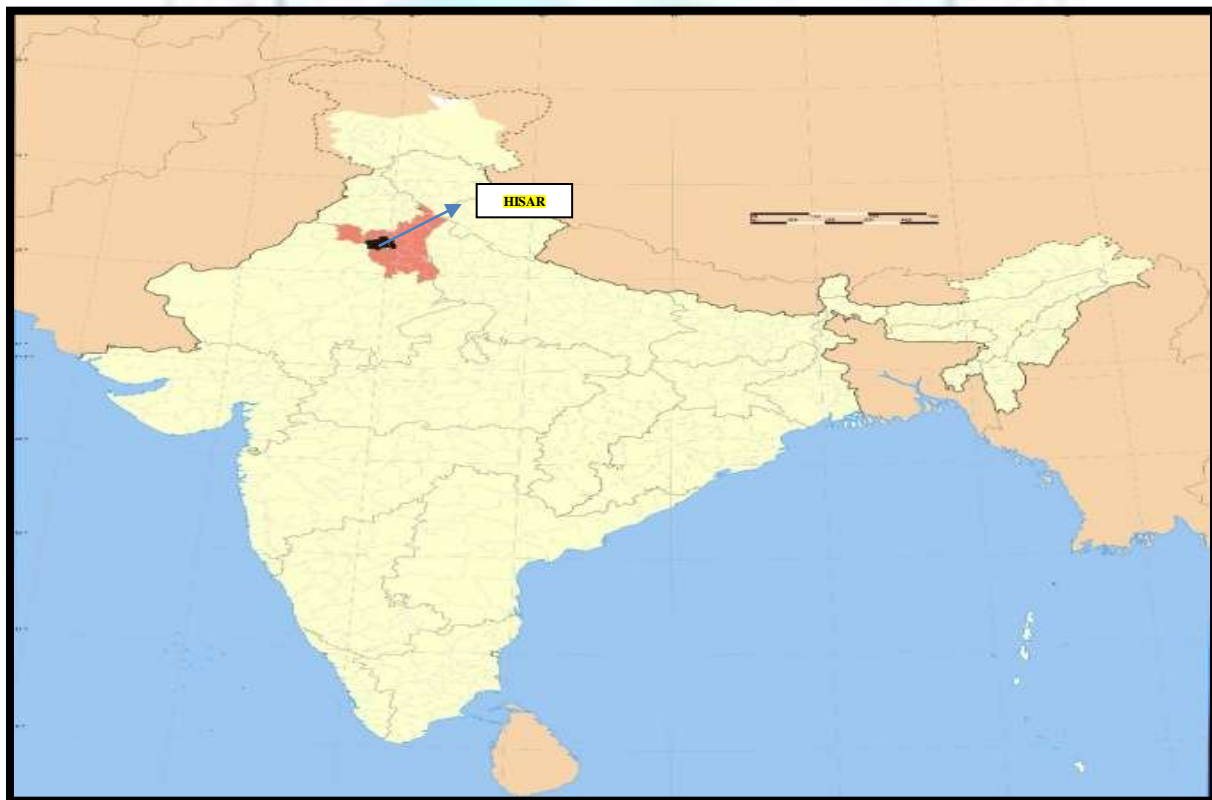
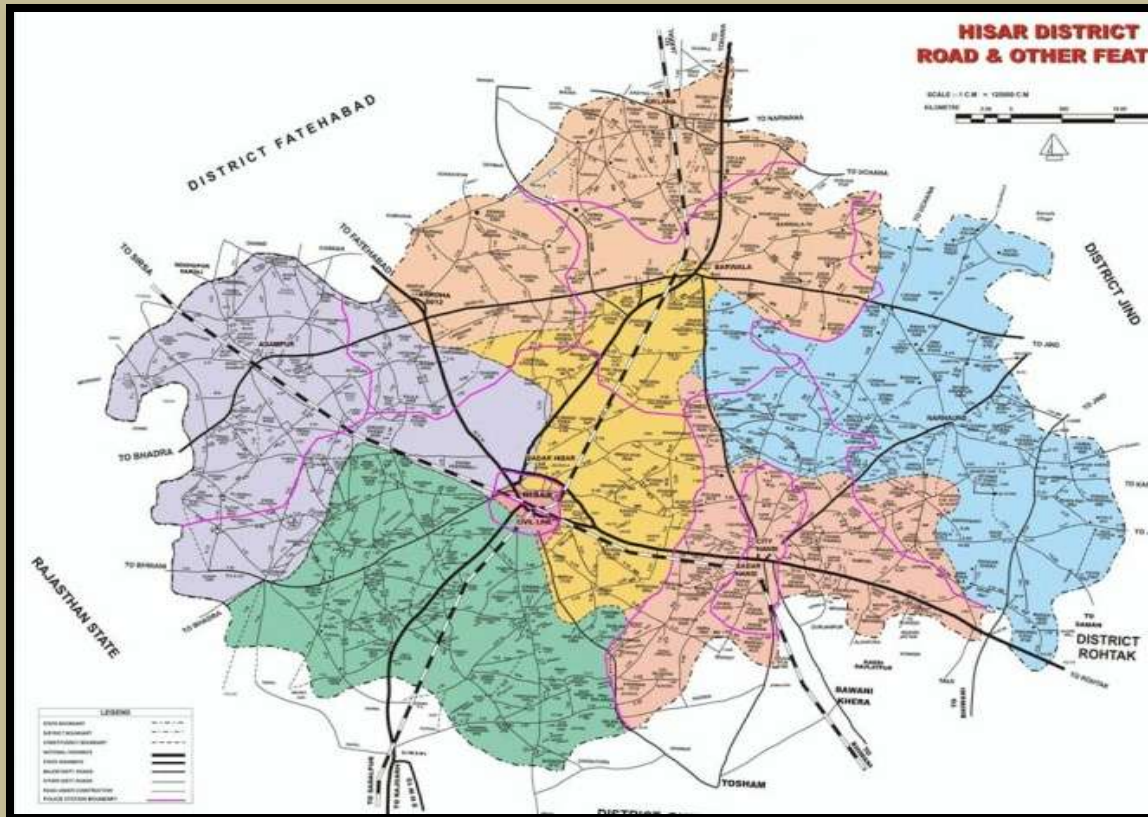


Fig 1.1 Map of Hisar District and the Location of Hisar in India

## **2. LITERATURE REVIEW**

World Health Organization has revealed in its first ever Global Status Report on Road Safety (2009) that more people die in road accidents in India than anywhere else in the world, including the more populous china. According to Sandip Chakraborty and at all did analysis of traffic accident characteristic of Kolkata. The study mainly aimed at developing accident model and checking level of road safety considering four parameters namely accident severity index, accident fatality rate, accident fatality risk and accident risk. According to A. Ramesh and at all (2011) made an attempt to develop road accident models for Hyderabad Metropolitan City of India. This study was confined to accident prediction models and identifying the black spots in Hyderabad city. R.K Singh and at all (2001) proposed a study on accident analysis and Prediction of Model on National Highway-77 aiming at finding the monthly and annual variation in accident rate, effect of traffic volume on accident rate and to develop model using AADT and road condition.

## **3. STUDY AREA**

Haryana State is a suitable case study because it hosts Hisar major traffic center, fastest growing city, and most heavily motorized urban area in the country. Consequently, the state has one of the highest accident and casualty rates in the country. Moreover, the traffic situation in Haryana state is bad because of the absence of effective planning, vehicle-misuse, poor management, inadequate street parking, traffic congestion, delays. We study the accidental analysis of Hisar City. Its population growth has been in excess of approximately 3.33% per annum. This population increase has been accompanied increase in motor vehicle and traffic accident. In this present we have studied that accident rates in Hisar City are still very much on the high side as compared to other cities in the state.

### **Objectives**

The major objectives of this study are:-

- To study the accident severity index for the three year 2012, 2013, 2014.
- To analyze the vehicles involved in accidents among different vehicles during 2012, 2013, 2014.
- To appraise the hourly accidents took place during 2012, 2013, 2014.

## **4. MATERIALS AND METHODS**

### **4.1 Data Base:**

The data base which is used to analysis this study are as follows:-

1. Number of person Death with the Number of accidents for the three year 2012, 2013, 2014.
2. Time distribution of occurrence of accidents for the three year 2012, 2013, 2014.
3. Different type of vehicles involved in accidents for the three year 2012, 2013 and 2014.

### **4.2 Methodology:**

The methodology that has been use to prepare this paper form its start to end are as follows:-

### **4.3 Data Collection:**

All the required data which have been used to give a structure to this paper are being collected from SP office and PWD department in Hisar. The accidental data were collected for the year 2012, 2013 and 2014. Also Field study is conducted at selected points for performance visual survey of traffic in Hisar city. From the PWD department collect the data of prone areas and the speed limits according to the road design.

### **4.4 Collection of Maps:**

The Hisar Superintendent of police boundary area map and road network and prone area map are collected from the PWD (B&R), Hisar.

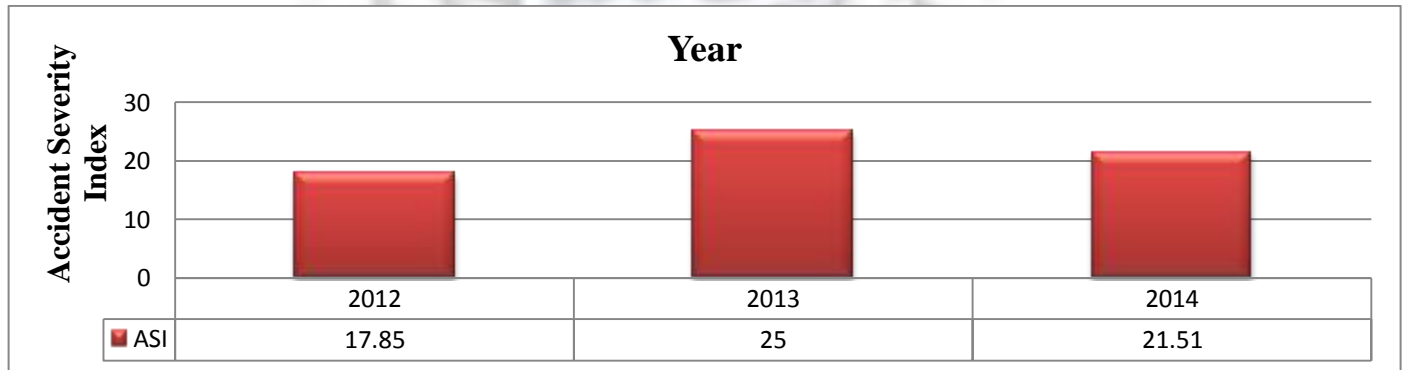
#### 4.5 Data Analysis and Presentation:

##### Accident Severity Index

The Accident Severity Index measure the seriousness of an accident. It is defined as the number of person death per 100 accidents. Table 4.1 presents Accident Severity Index for Hisar city from 2012-2014. It is seem that number of deaths increase and decrease with the year wise. From 2012 to 2013 the numbers of accidents were increased. There were 15 deaths are registered in 2012 and this figure reached 23 in 2013 with the effort of local authorities year 2014 shows a depletion with decrease in deaths.

**Table 4.1: Accident Severity Index**

Year	Number of person deaths	Total number of accidents	ASI (%)
2014	17	79	21.51
2013	23	92	25
2012	15	84	17.85



**Fig 4.1 Accident Severity Index (Persons killed per 100 accidents)**

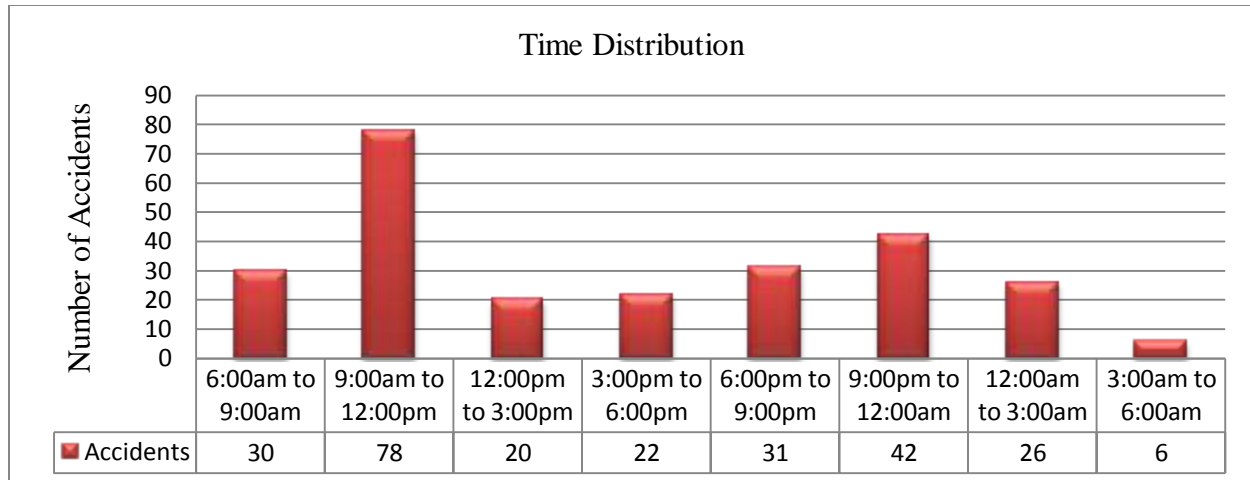
##### Time of Accidents

Table 4.2 shows time distribution of accident occurrence. It is observed that majority of accident have occurred during daytime. As it is clearly seen from the table, that maximum number that is 78 accidents happened during 9:00 am to 12:00 pm. This figure is high because traffic intensity during these hours is high. In this no. of accident variation are occurred in time to time.

**Table 4.2: Time Distribution of Occurrence of Accidents**

S.No.	Time	Year			Total Accidents
		2014	2013	2012	
1	6:00am to 9:00am	8	12	10	30
2	9:00am to 12:00pm	26	28	24	78
3	12:00pm to 3:00pm	6	9	5	20
4	3:00pm to 6:00pm	5	8	9	22
5	6:00pm to 9:00pm	10	9	12	31
6	9:00pm to 12:00am	14	12	16	42
7	12:00am to 3:00am	8	10	8	26
8	3:00am to 6:00am	2	4	0	6
<b>Total</b>					<b>255</b>





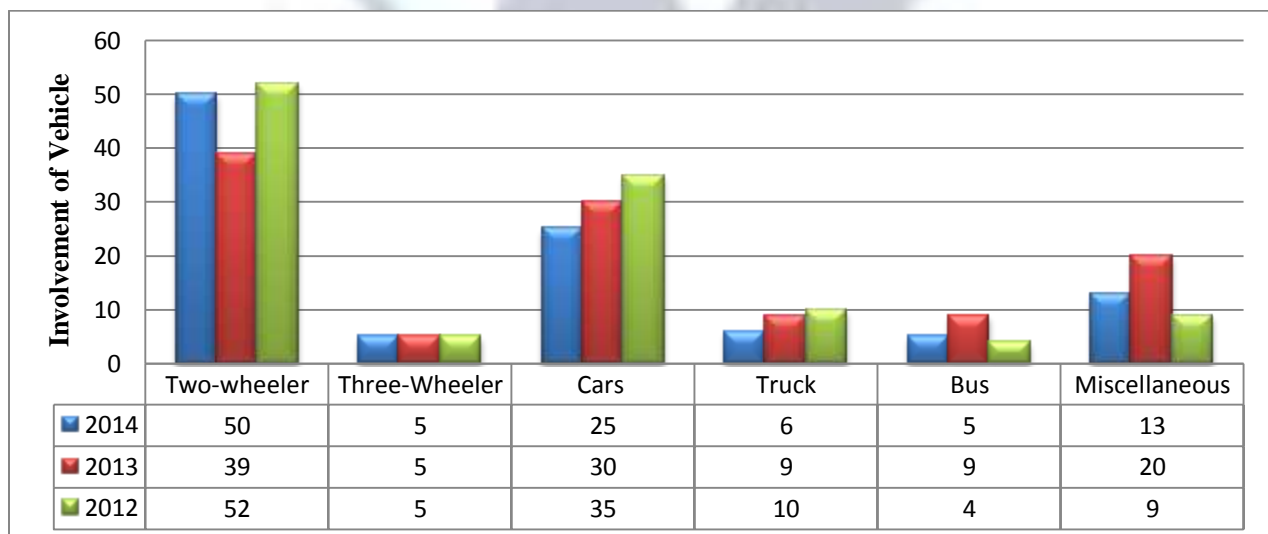
**Fig 4.2: Distribution of Road Accidents According to Time of occurrence**

### Vehicles Involved in Accidents

The vehicles involved in road accidents from 2012 to 2014 are shown in Table 4.3. The Table clearly represents that two-wheelers are involved in maximum numbers of accidents during this duration. Trucks and Buses having 25 and 18 cases of accidents from 2012 to 2014. On the other hand Tractor-Trolley, Jeep, Unknown is separately shown in miscellaneous type vehicle category. From the Table it is observed that two-wheeler are involved in maximum number of accidents followed by Trucks, Cars and buses.

**Table 4.3: Vehicle Involved in Accidents**

S.No.	Vehicle Type	Year			Total
		2014	2013	2012	
1	Two-wheeler	50	39	52	141
2	Three-Wheeler	5	5	5	15
3	Cars	25	30	35	90
4	Truck	6	9	10	25
5	Bus	5	9	4	18
6	Miscellaneous	13	20	9	42



**Fig 4.3: Graphical Presentation of Vehicles responsible for road Accidents**

## **5. RESULT AND DISCUSSION**

- a) In 2013 total number of accidents was 92 and a number of casualties were 23. As compare to 2012 year 2013 showed a rise in accidents and death toll by 8%.
- b) 2014 showed improvement with a downfall in accident and death toll by 10%.
- c) The spans between 9:00am to 12:00pm are rush hour for traffic therefore this span is home to highest number of accidents.
- d) Whereas span between 3:00am to 6:00am are peace hours of traffic with least number of accidents.
- e) Two-Wheelers are involved in maximum numbers of accident during this duration. Whereas the involvement of cars in accidents is found to be at 2<sup>nd</sup> number after Two-Wheeler.
- f) The involvement of buses and trucks in accidents is found to be in proportion to their share in traffic volume.



**Fig 5.1: Collision on NH 10**



**Fig 5.2 : Poll in the center of road.**



**Fig 5.3: Low Maintained Public Transport**



**Fig 5.4: Rules are weak and carelessness**

## **6. CONCLUSIONS**

In this study we conclude that following:

1. The Accident Severity Index (ASI) for Hisar City has increased from 17.85 in 2012 to 25 in 2013. It indicates more deaths taking place in road accidents. Whereas in 2014 the ASI as compare to 2013 was decline with 3.5%.
2. It is observed that the percentage of day time accidents (58.8%) is much higher than the night time (41.17%) accidents. This may be attributed to high traffic volume and high traffic congestion on the road during day time.
3. According to the type of vehicle involved in accidents, it is observed that Two-Wheeler are involved in maximum number of accidents (42.5%), followed by truck/bus (12.91%), cars (27.19%) and miscellaneous (12.68%).

## **REFERENCES**

- [1]. M. Ziyadi and at all (2010), "Prediction of Accident Severity using Artificial Neural Network", International Journal of Civil Engineering Volume 9, No 1, March 2011.
- [2]. Keli k and at all (2008), "Missing the signs. The impact of Cell Phone Use on Driving Performance", Journal of Psychology, volume 1, 2008.
- [3]. Global Status Report on road safety (2009) published by World Health Organization.
- [4]. Sandip chakraborty and at all (2005), "Traffic Accident Characteristics of Kolkata", Transport and communication Bulletin for Asia and the pacific, No 74, 2005.
- [5]. A. Ramesh and at all (2011), "Road Accident Models for Hyderabad Metropolitan city of India", India Highways Journal, Volume 39, No 7, 2011.
- [6]. MORTH (Ministry of Road Transport and Highways) survey report on road accidents.
- [7]. R K Singh and at all (2001), "Accident Analysis and prediction of Model on National Highways" International Journal of advanced technology in civil Engineering, Volume 1, Issue 2, 2012.
- [8]. S. Harenen and at all (2004), "Development of Prediction Models for Motorcycle Crashes at Signalized Intersection on Urban Roads in Malaysia", Journal Transportation and Statistics, Volume 7, No 2, 2004.

